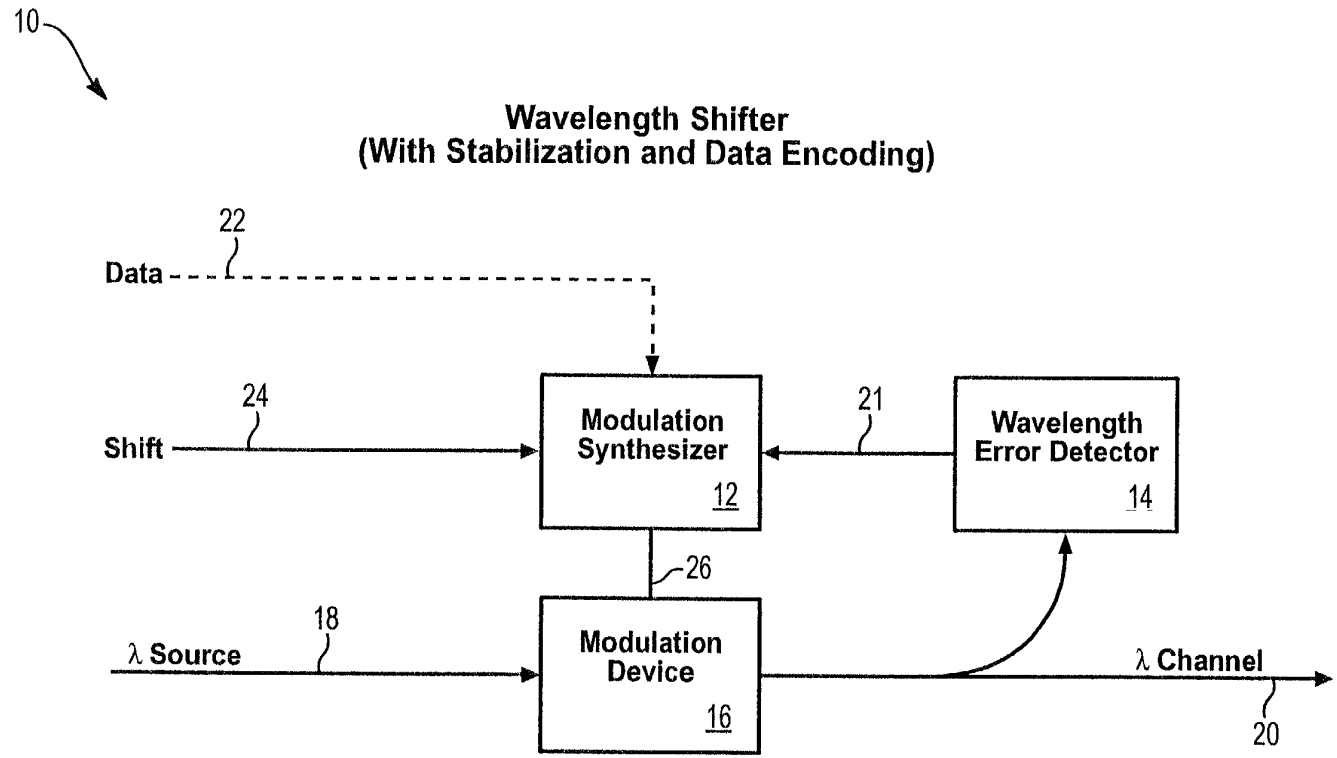

10
Wavelength Shifter
(With Stabilization and Data Encoding)
22
Data
24
Shift
Modulation Synthesizer
12
21
Wavelength Error Detector
14
26
18
λ Source
Modulation Device
16
λ Channel
20

FIG. 1

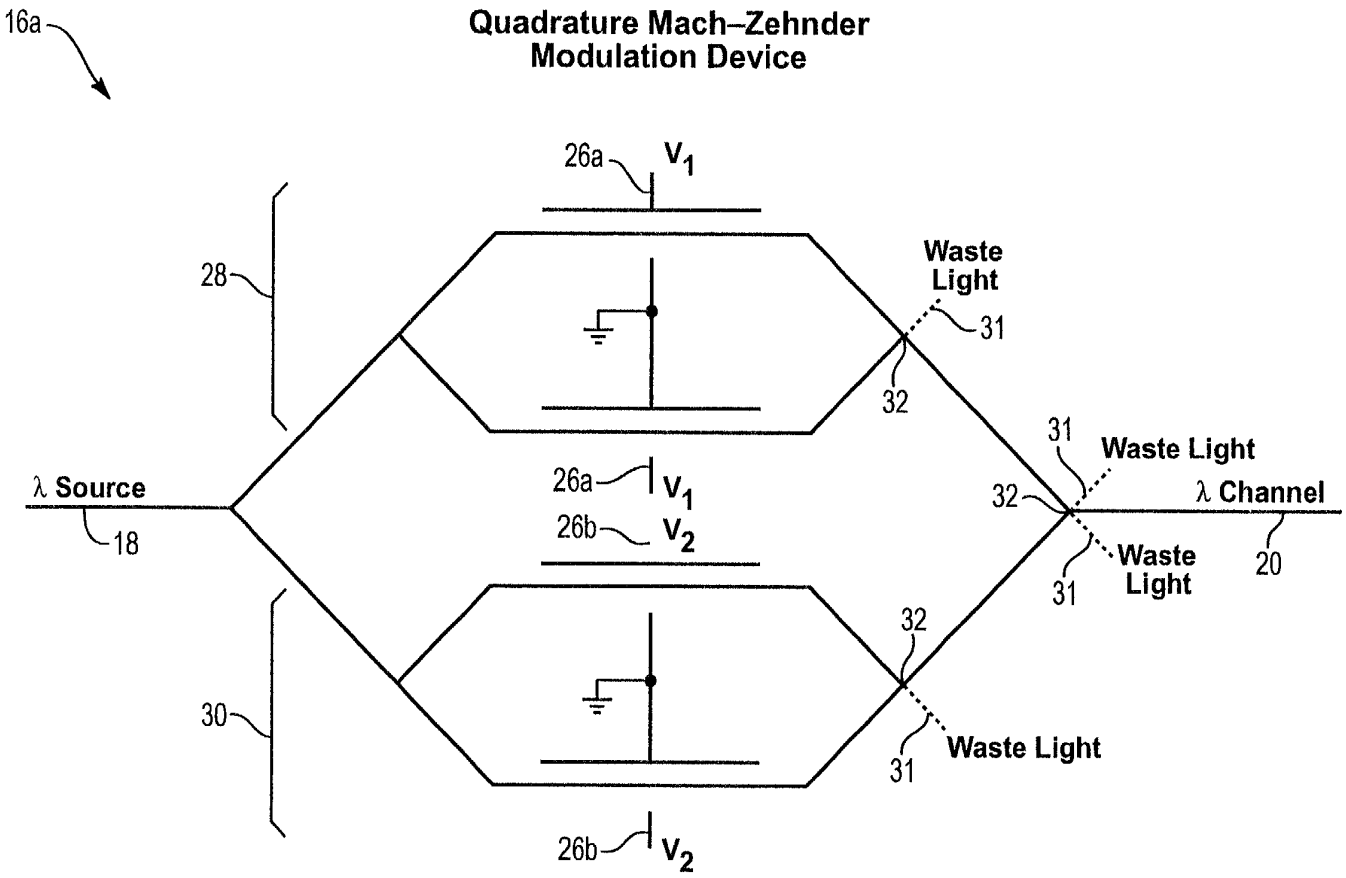

16a
Quadrature Mach–Zehnder
Modulation Device
26a
V_1
28
Waste
Light
31
32
31
Waste Light
λ Source
18
26a
V_1
26b
V_2
32
λ Channel
20
Waste
Light
31
32
30
31
Waste Light
26b
V_2

FIG. 2

PATENT APPLICATION

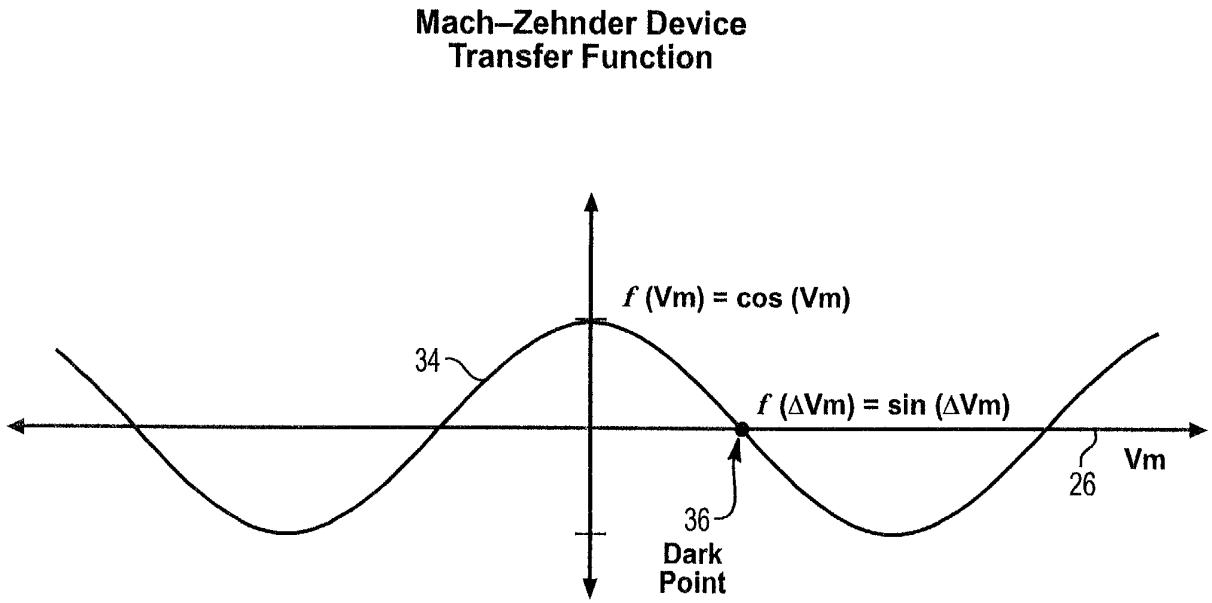


FIG. 3

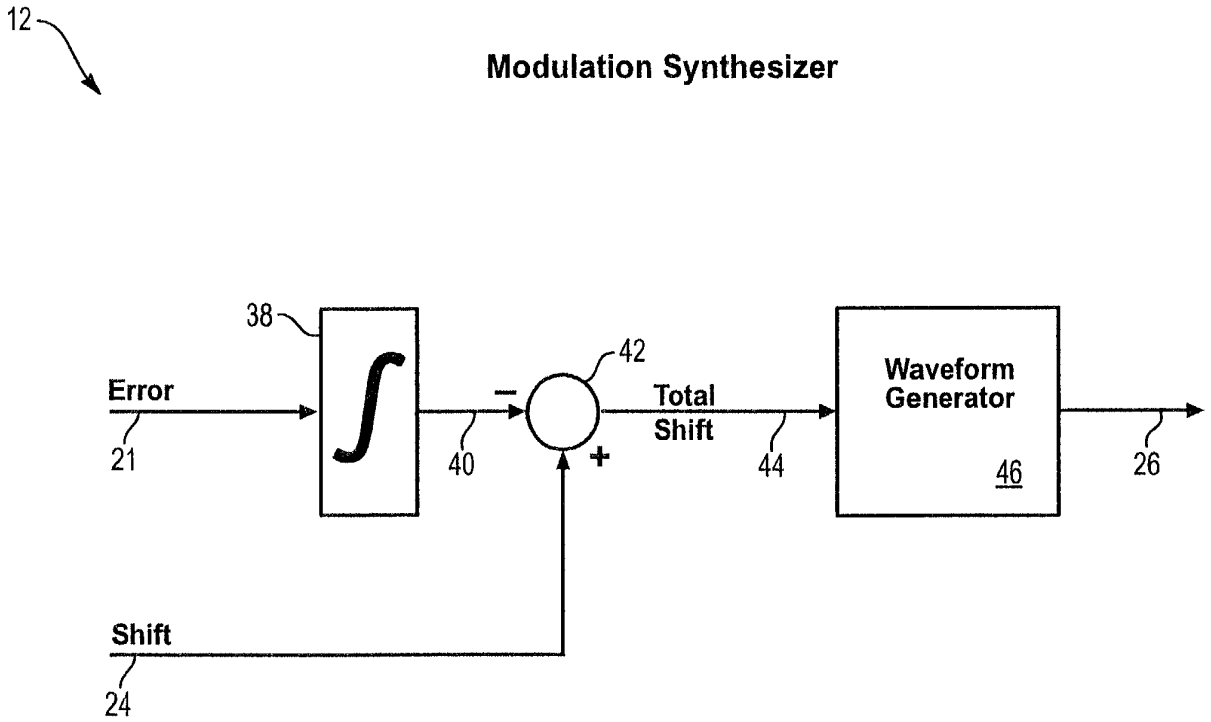

12
Modulation Synthesizer
38
42
Error
21
40
−
+
Total
Shift
44
Waveform
Generator
46
26
Shift
24

FIG. 4

Patent Application

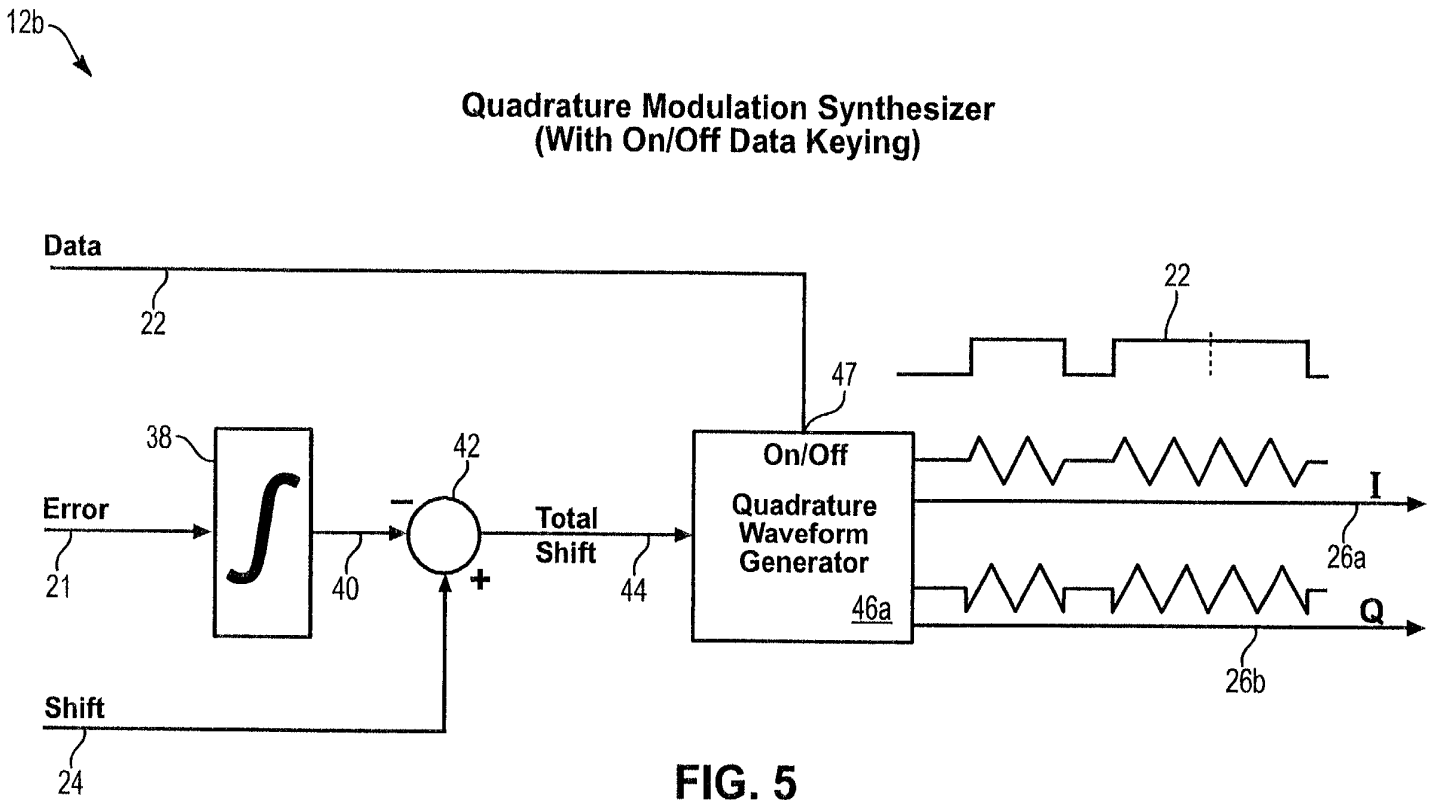


FIG. 5

Patent Application

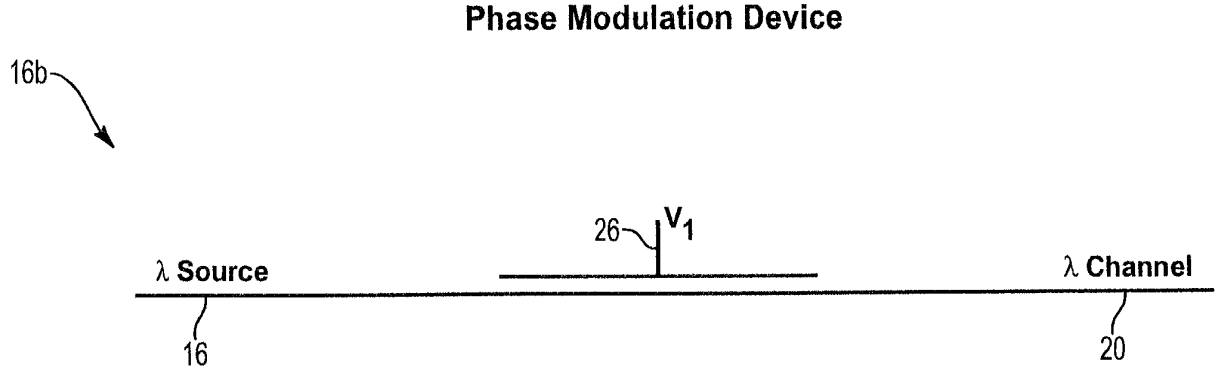


FIG. 6

Patent Application

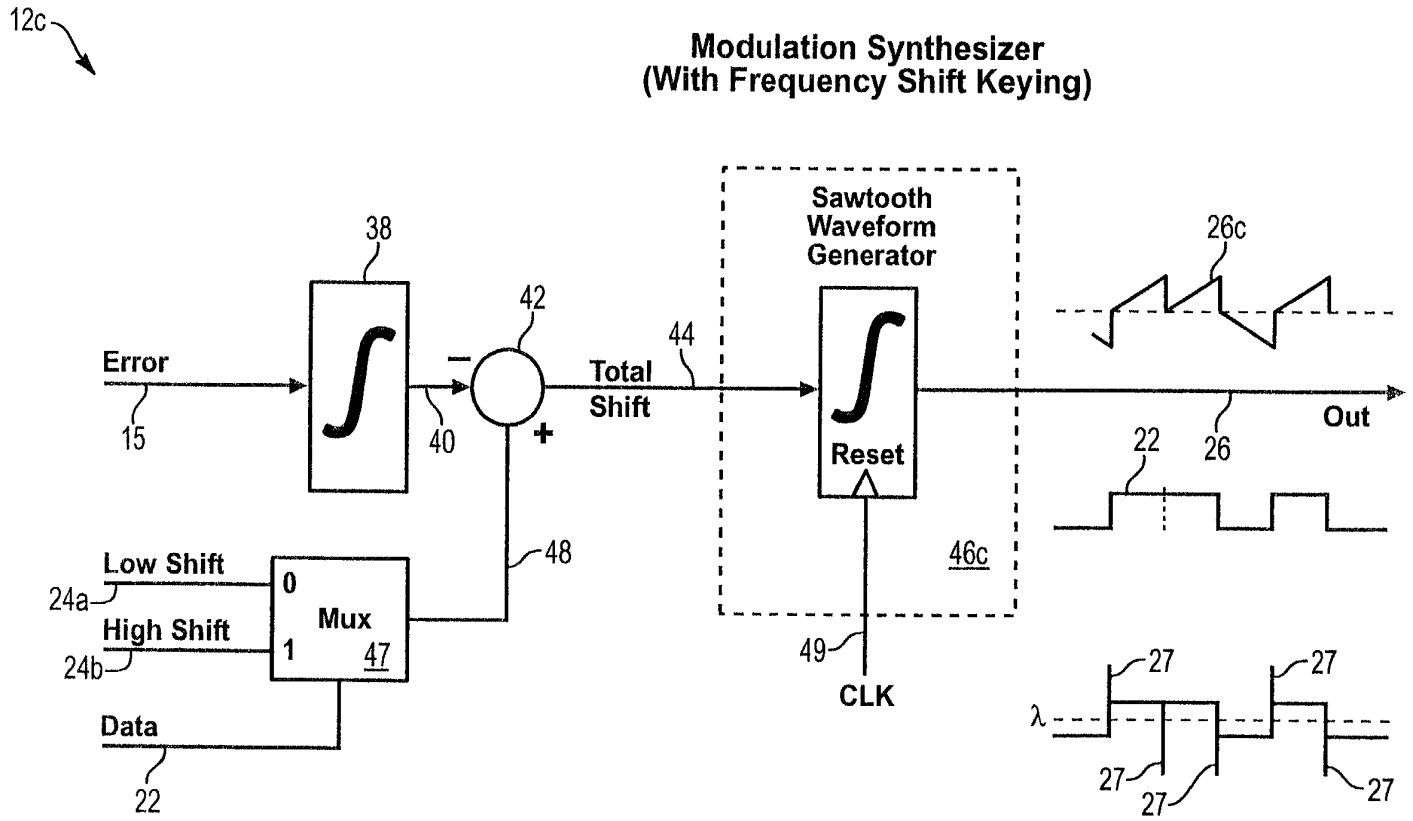


FIG. 7

Patent Application Publication

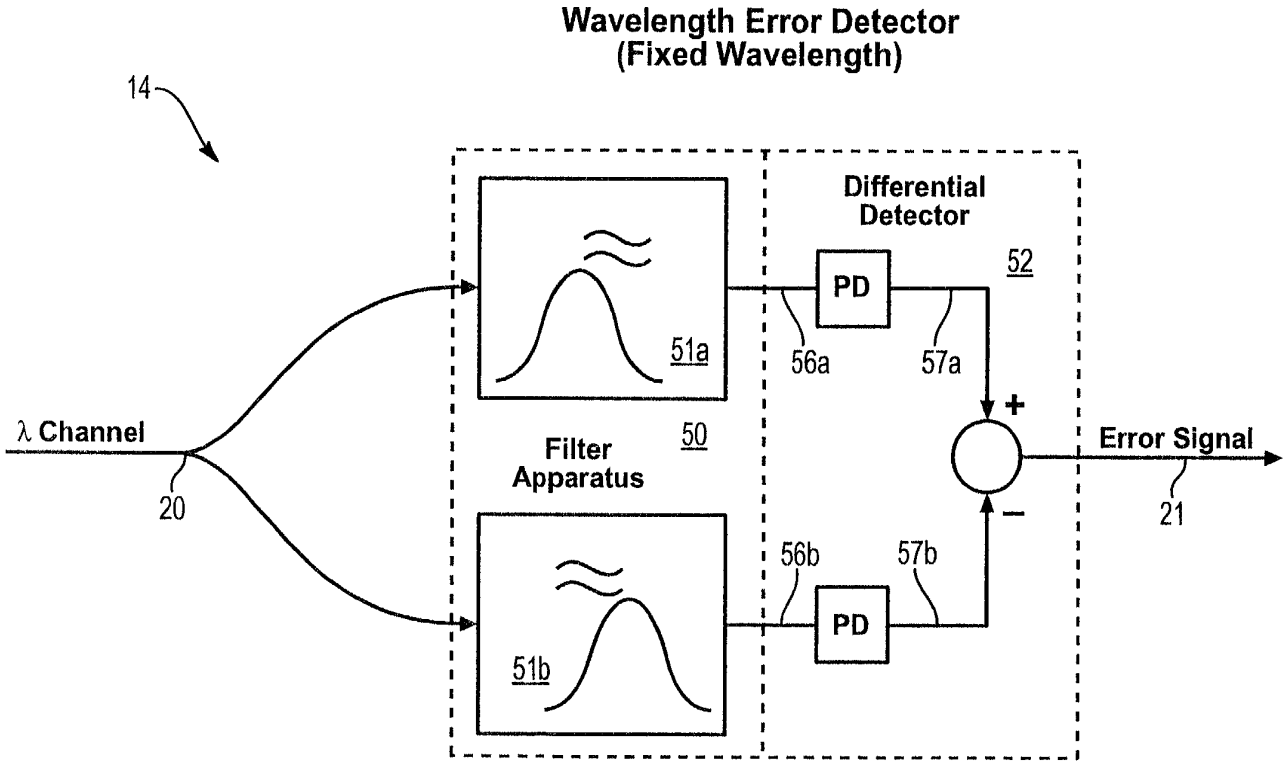


FIG. 8

Patented Patent

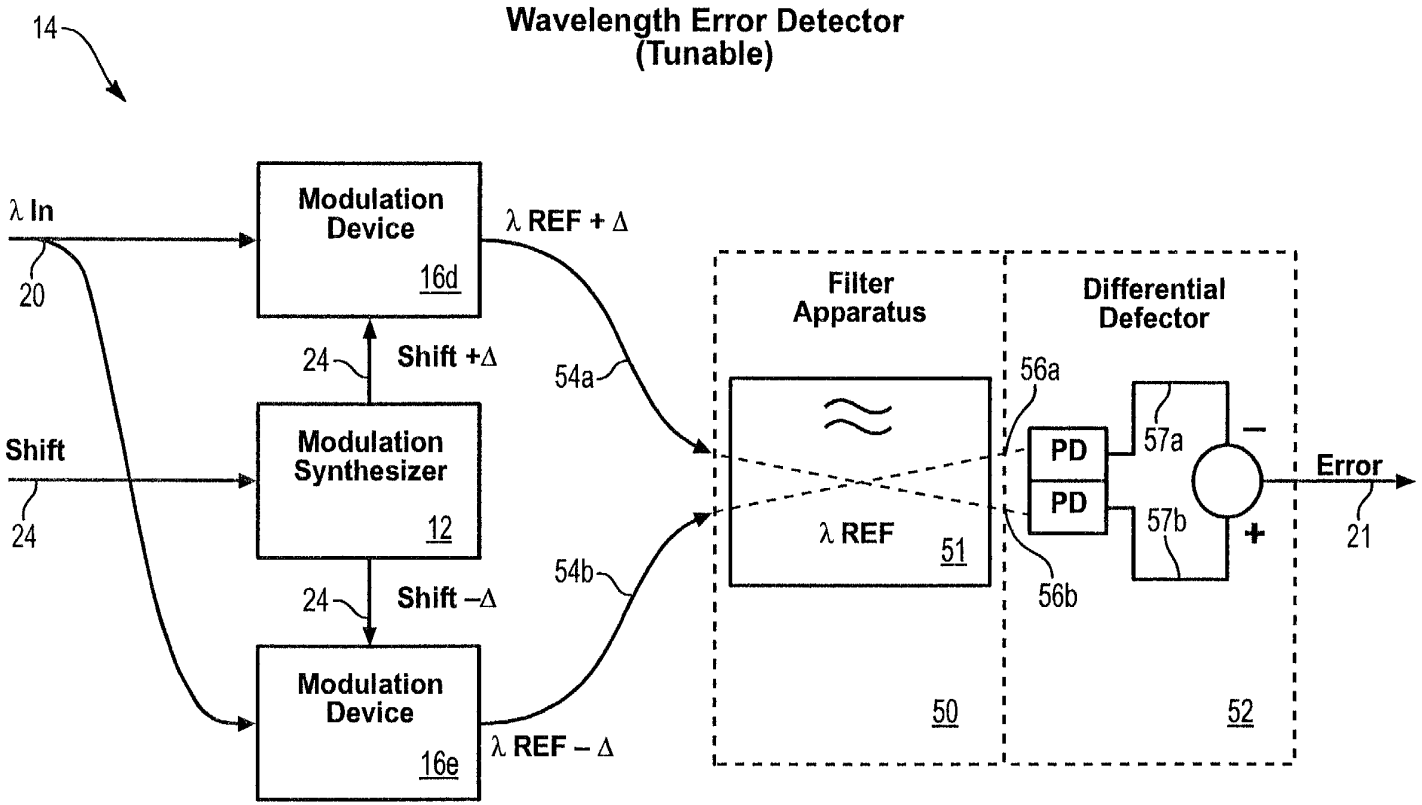


FIG. 9

Patent Application Publication

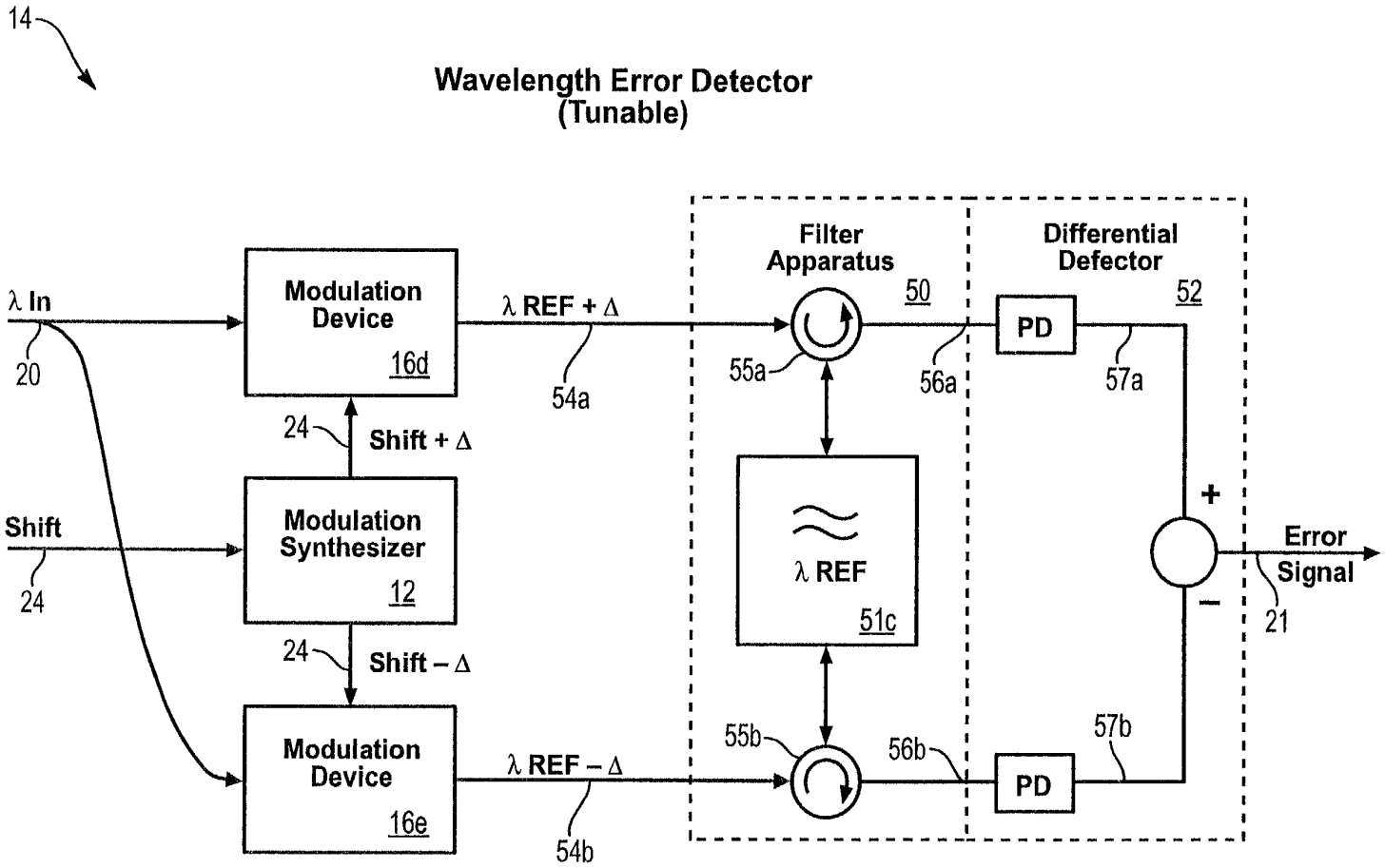


FIG. 10

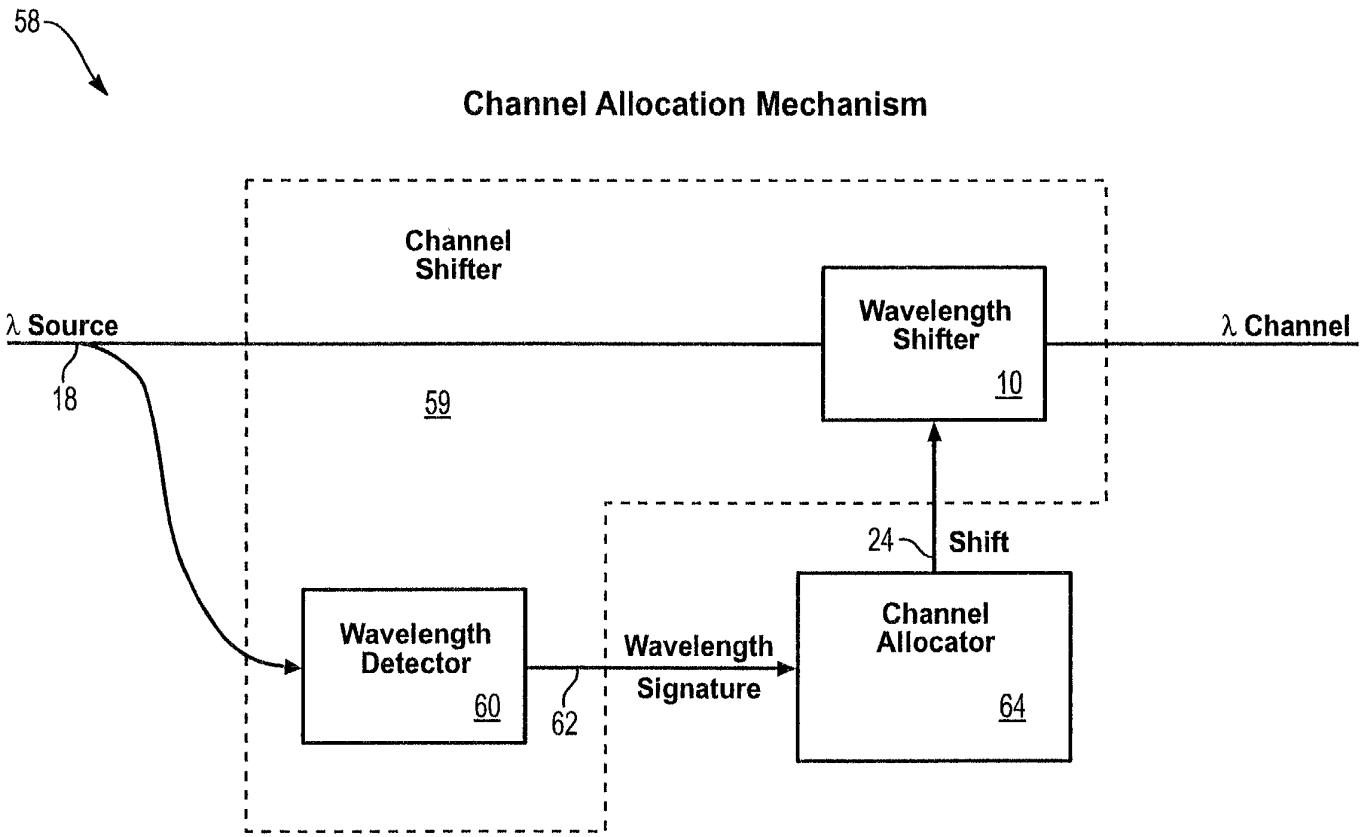

58
Channel Allocation Mechanism
Channel
Shifter
λ Source
18
59
Wavelength
Shifter
10
λ Channel
24
Shift
Wavelength
Detector
60
62
Wavelength
Signature
Channel
Allocator
64

FIG. 11

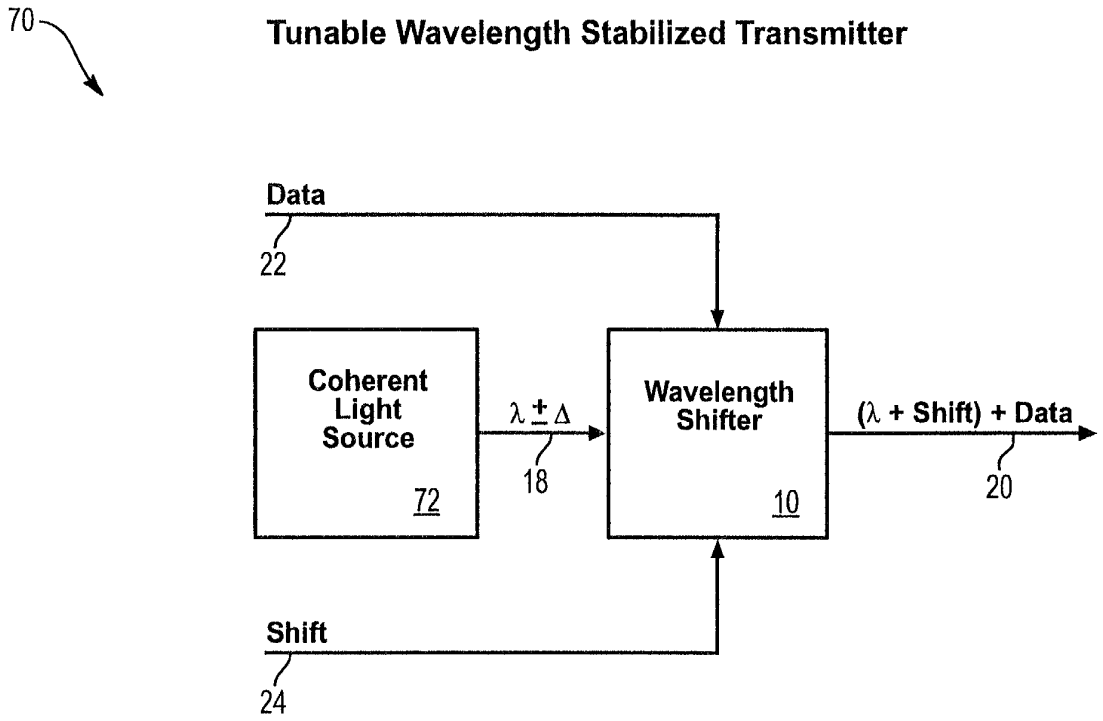

70
Tunable Wavelength Stabilized Transmitter
Data
22
Coherent Light Source
72
λ ± Δ
18
Wavelength Shifter
10
(λ + Shift) + Data
20
Shift
24

FIG. 12

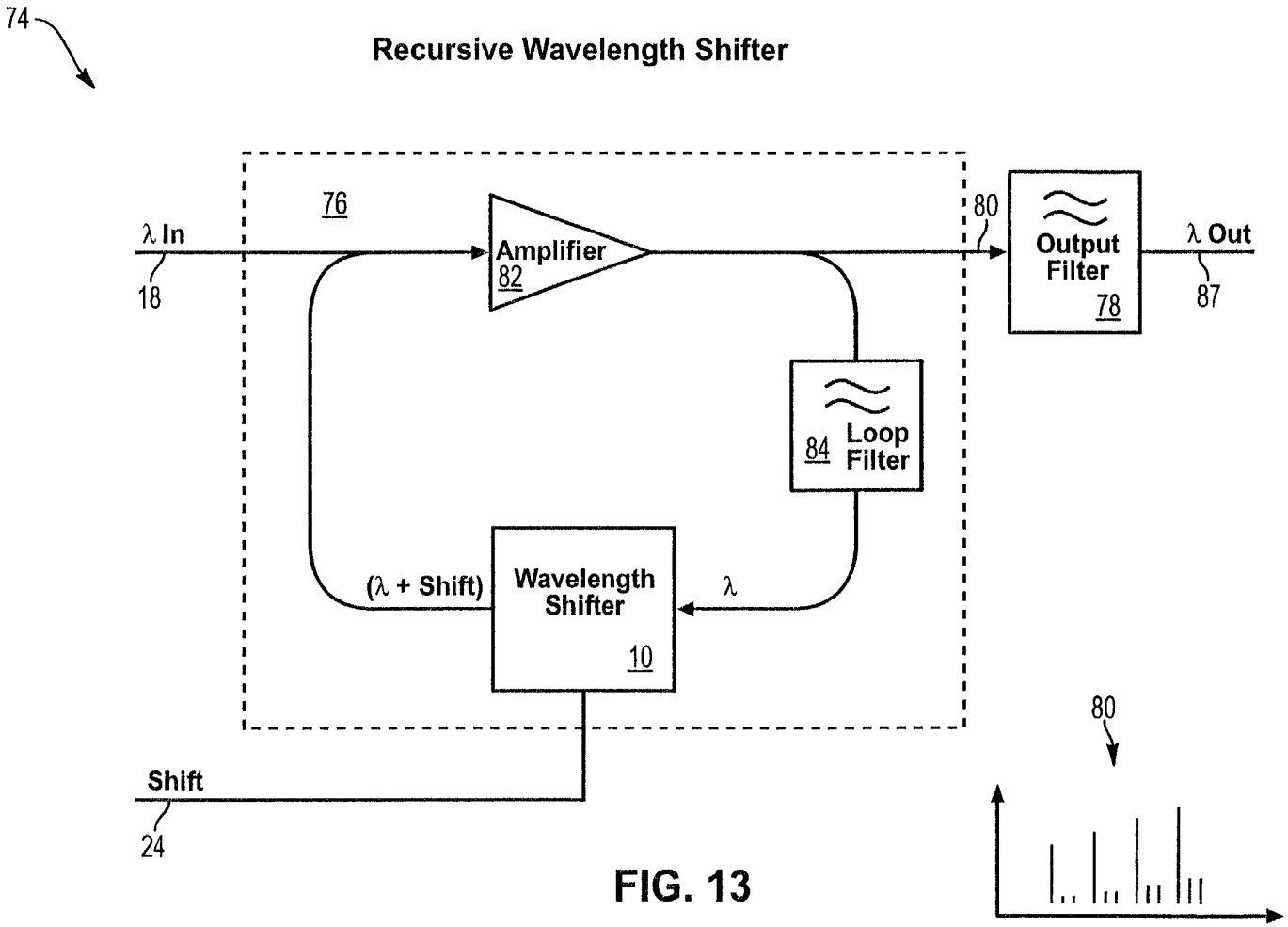

74
Recursive Wavelength Shifter
76
λ In
18
Amplifier
82
80
Output
Filter
78
λ Out
87
84 Loop
Filter
(λ + Shift)
Wavelength
Shifter
10
λ
Shift
24
80

FIG. 13

Patent Pending

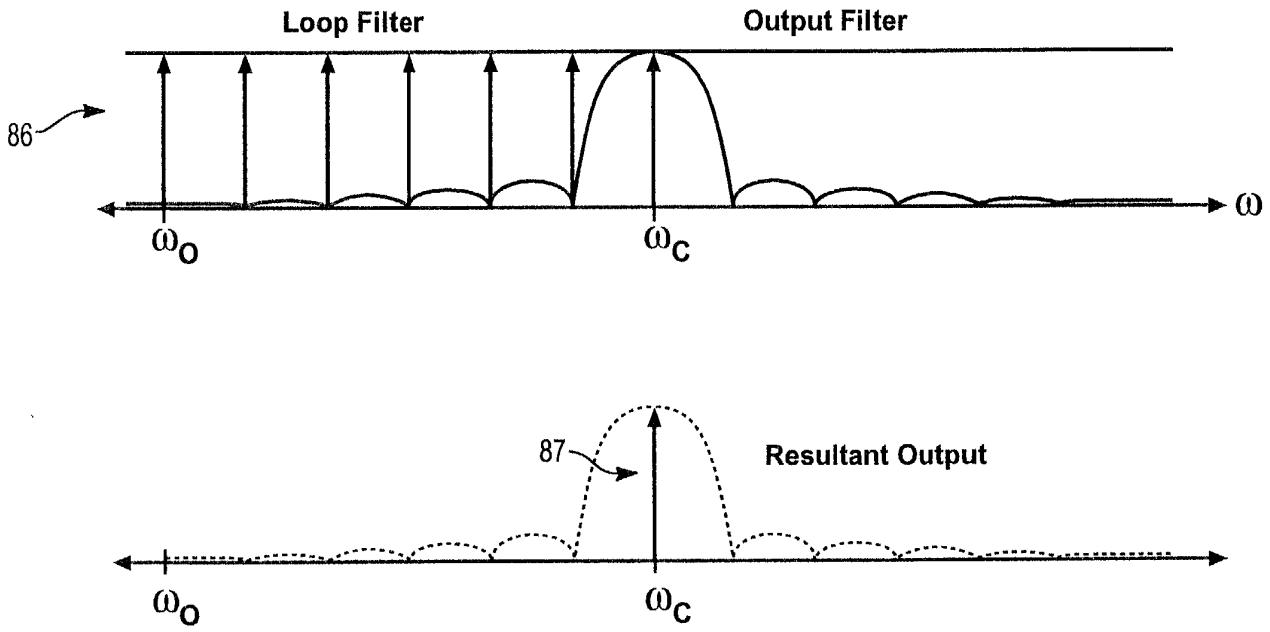


FIG. 14

Patent Application

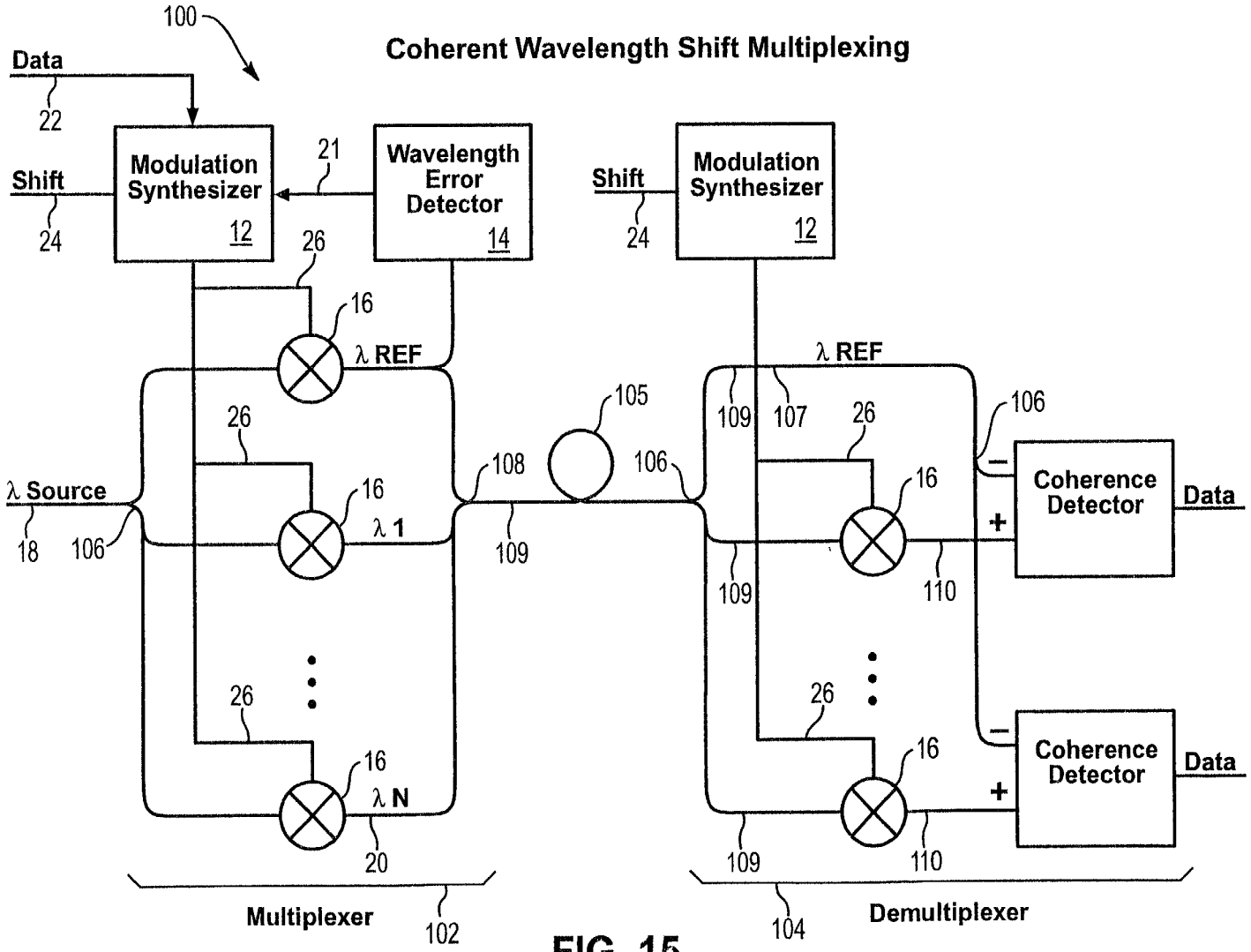


FIG. 15

Document Received

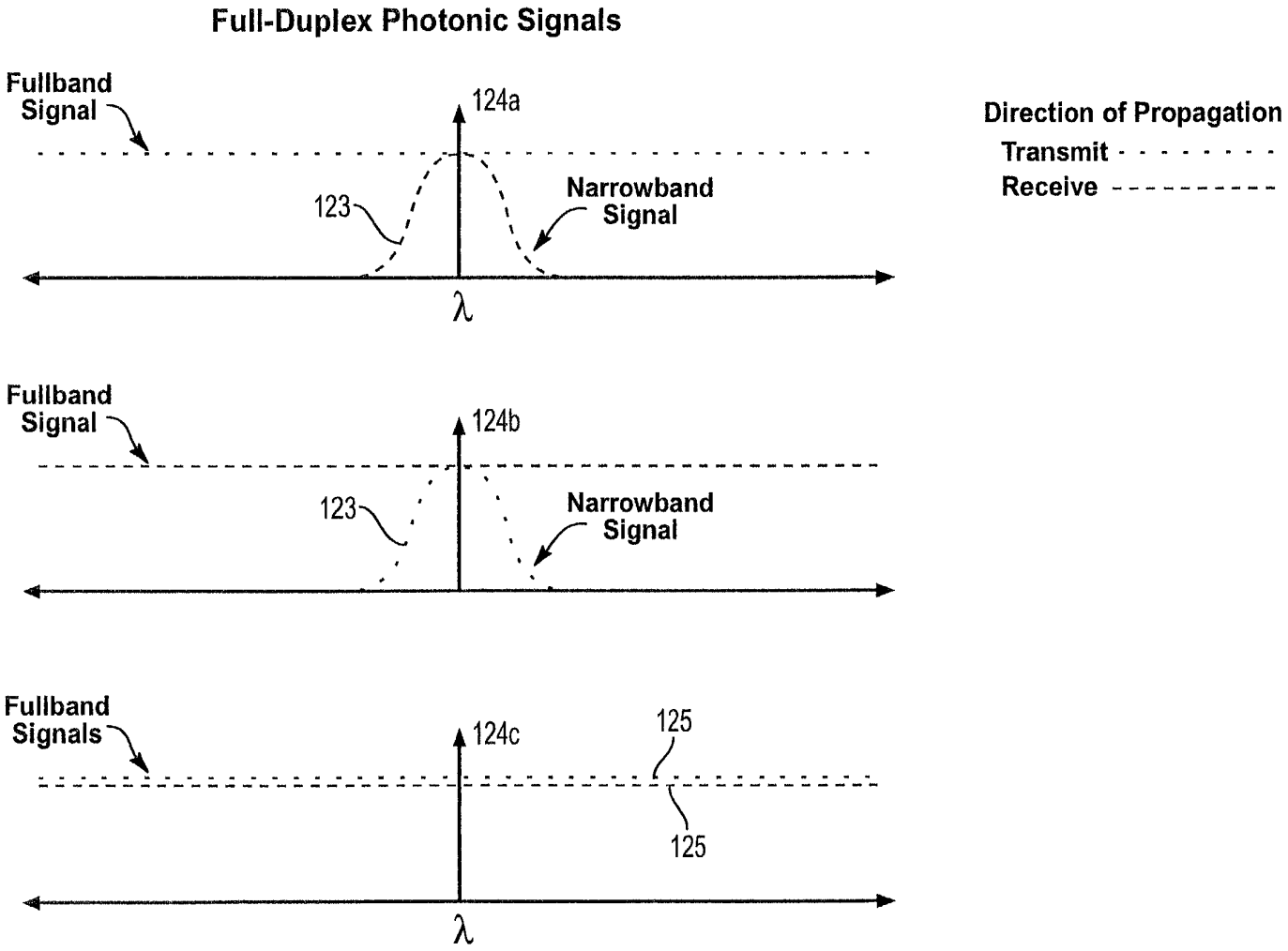


FIG. 16

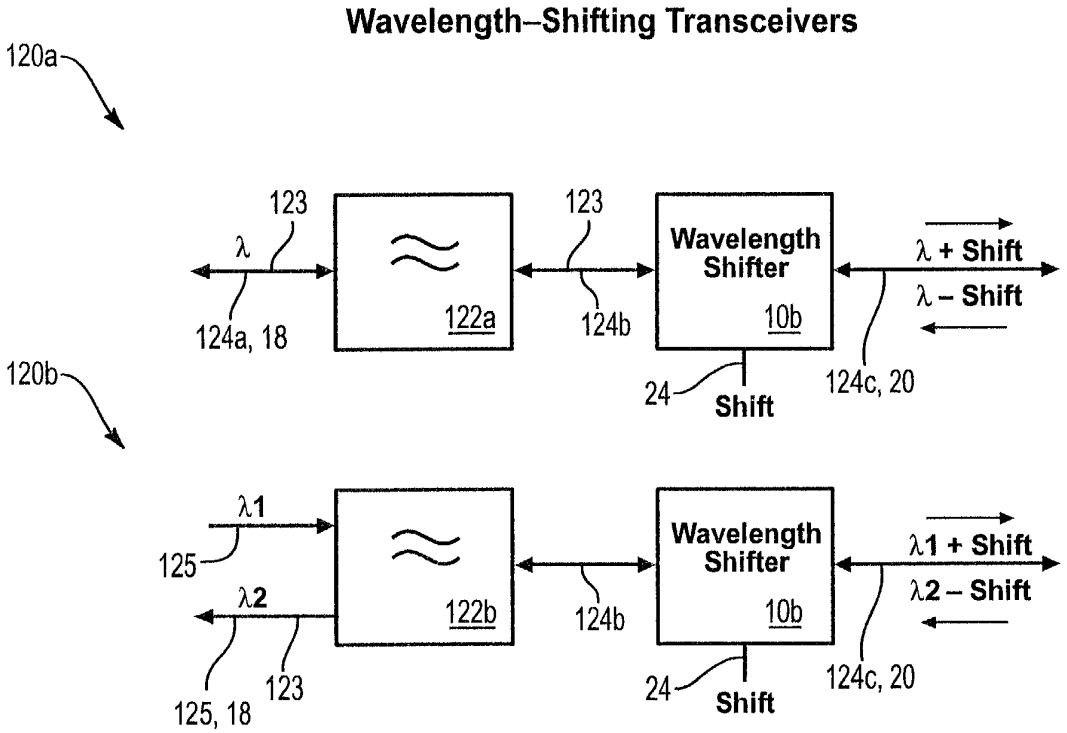

Wavelength–Shifting Transceivers
120a
120b
123
λ
124a, 18
122a
123
124b
Wavelength Shifter
10b
λ + Shift
λ – Shift
24
Shift
124c, 20
λ1
125
λ2
125, 18
123
122b
124b
Wavelength Shifter
10b
λ1 + Shift
λ2 – Shift
24
Shift
124c, 20

FIG. 17

Standard Patent Drawing

Full-Duplex Narrowband Filters

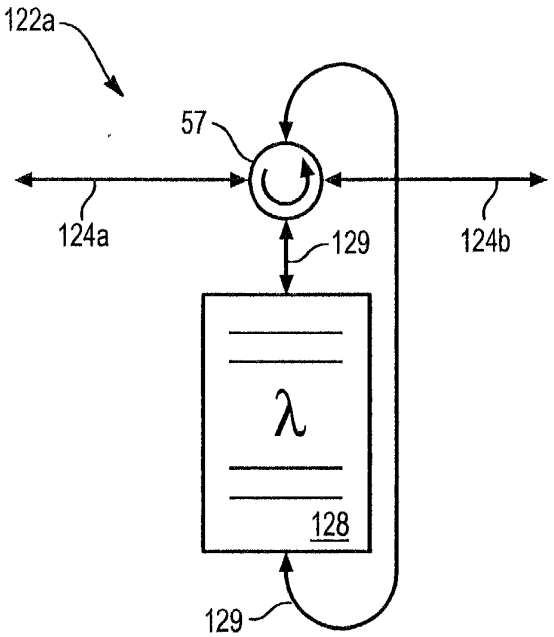


FIG. 18a

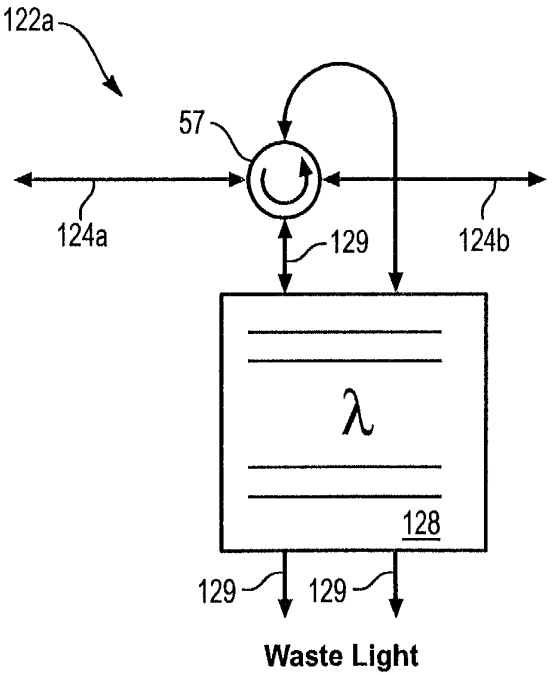


FIG. 18b

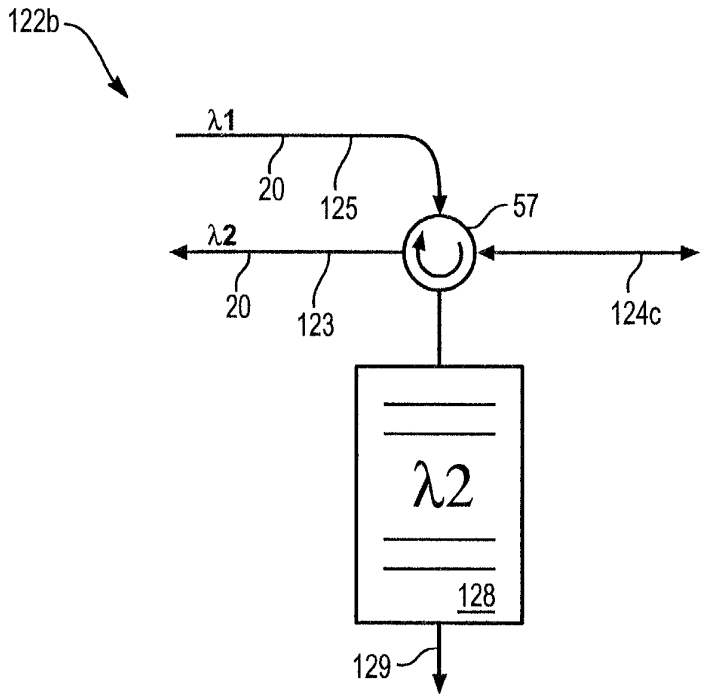

Pseudo Full–Duplex Narrowband Filter
122b
λ1
20
125
57
λ2
20
123
124c
λ2
128
129

FIG. 19

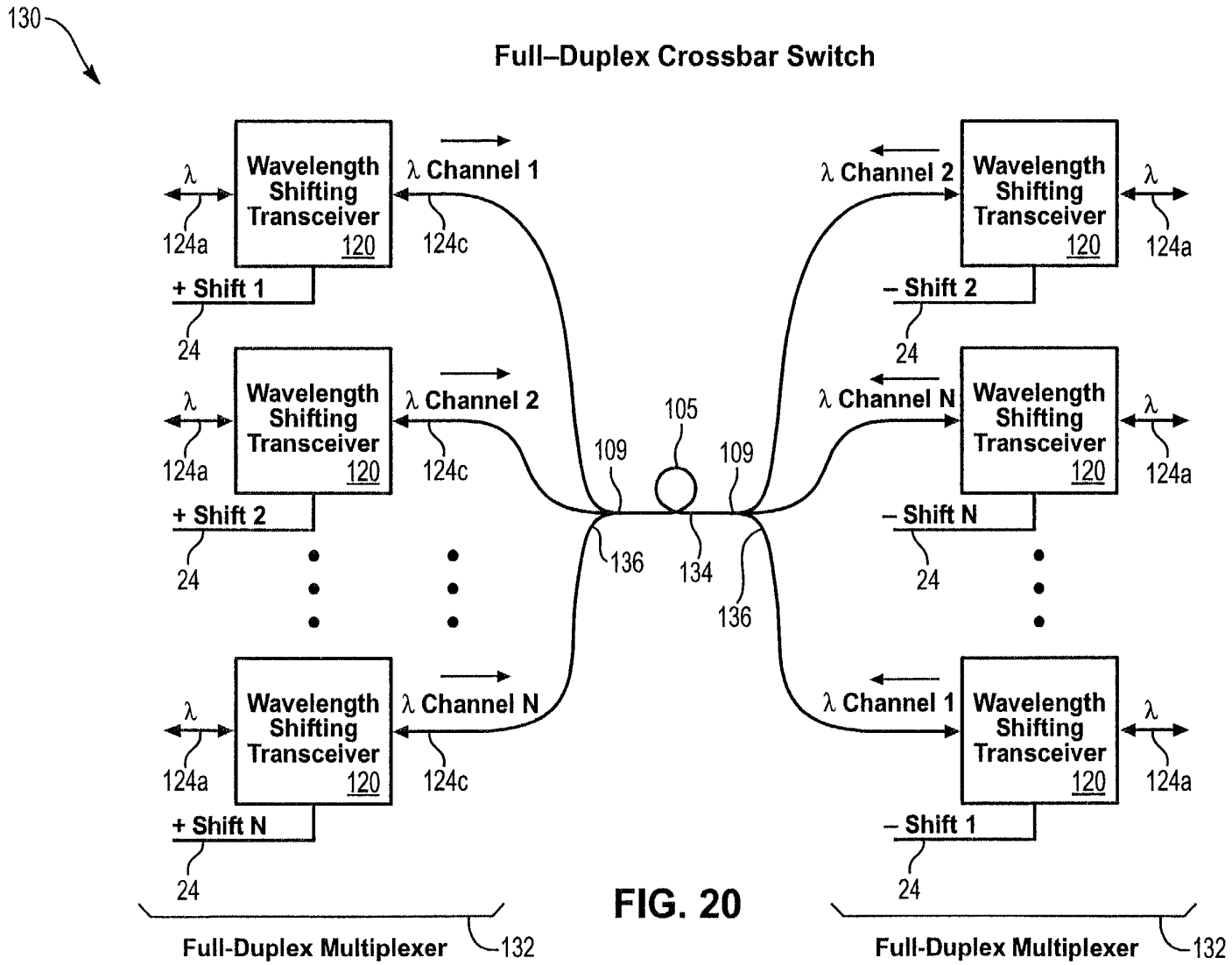

130
Full–Duplex Crossbar Switch
Wavelength Shifting Transceiver 120
λ
124a
124c
λ Channel 1
λ Channel 2
λ Channel N
+ Shift 1
+ Shift 2
+ Shift N
– Shift 2
– Shift N
– Shift 1
24
105
109
136
134
Full-Duplex Multiplexer
132

FIG. 20

Patent Application Publication

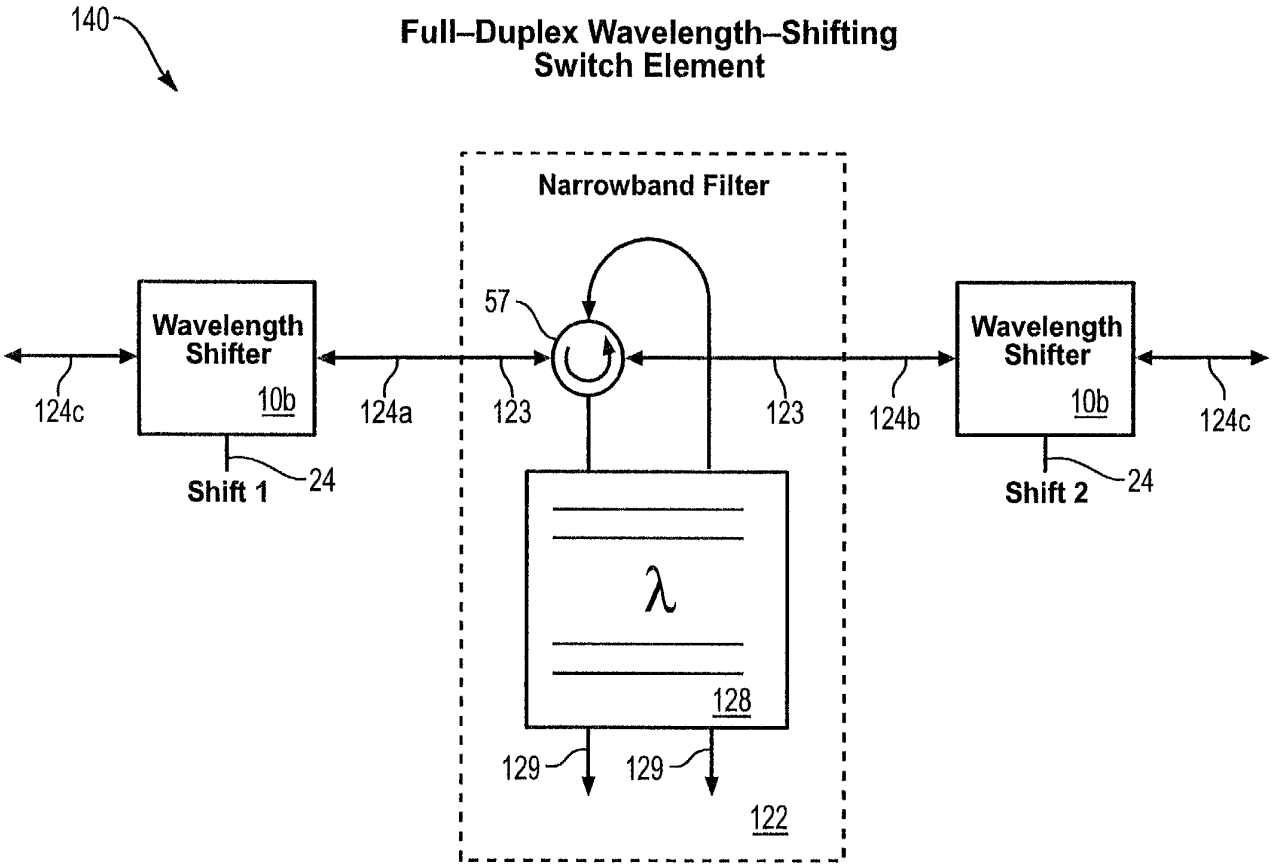


FIG. 21

Redacted Redacted

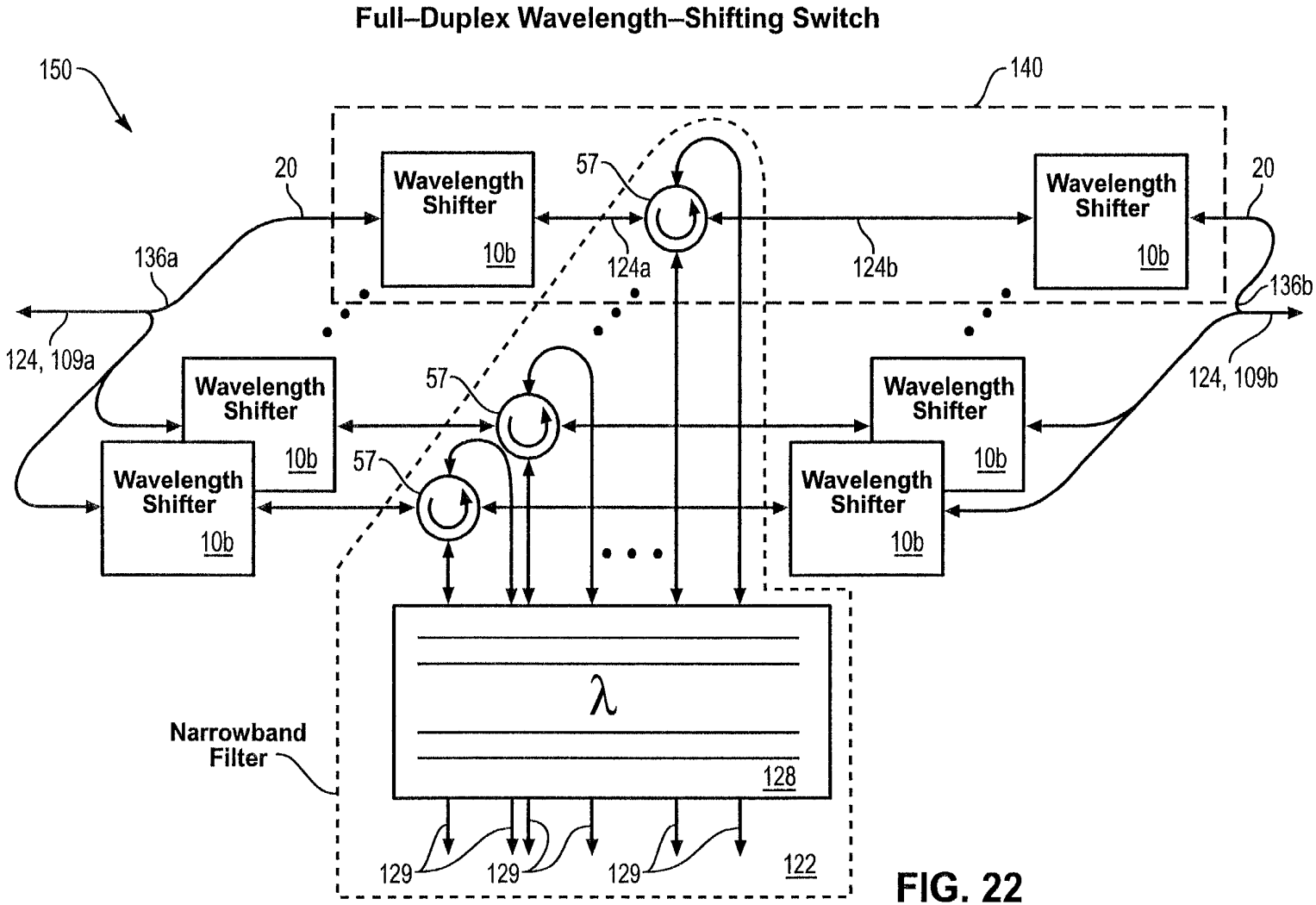


FIG. 22

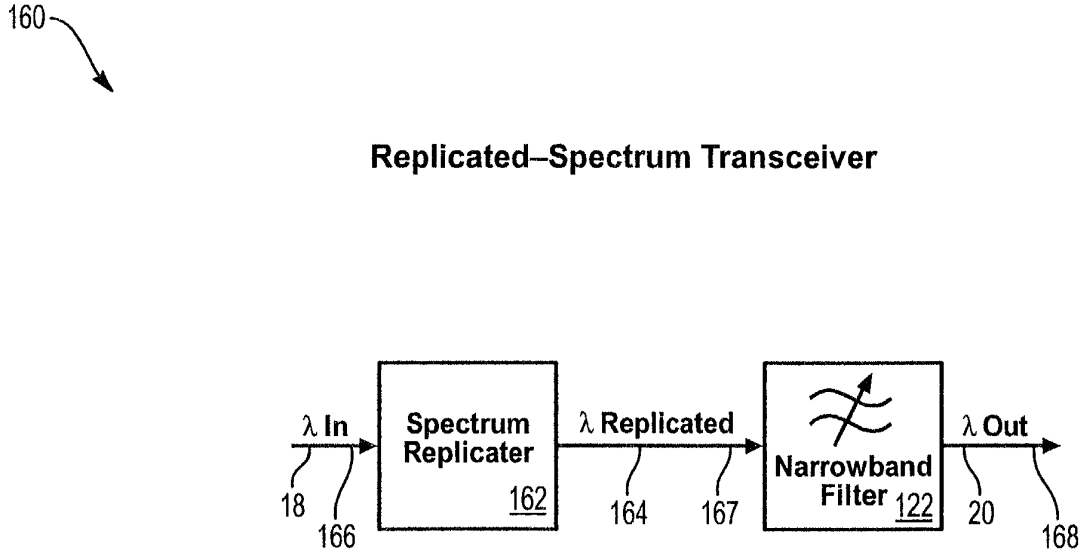

160
Replicated–Spectrum Transceiver
λ In
18
166
Spectrum Replicater
162
λ Replicated
164
167
Narrowband Filter
122
λ Out
20
168

FIG. 23

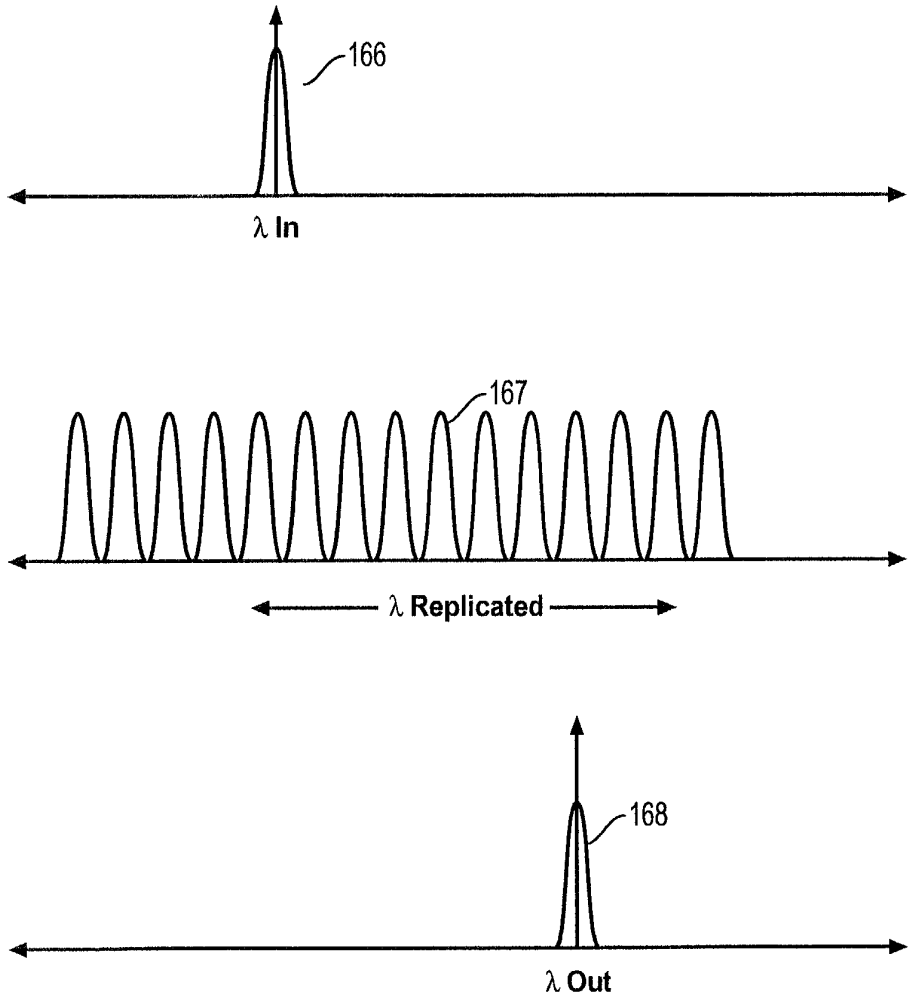


FIG. 24

Document Received

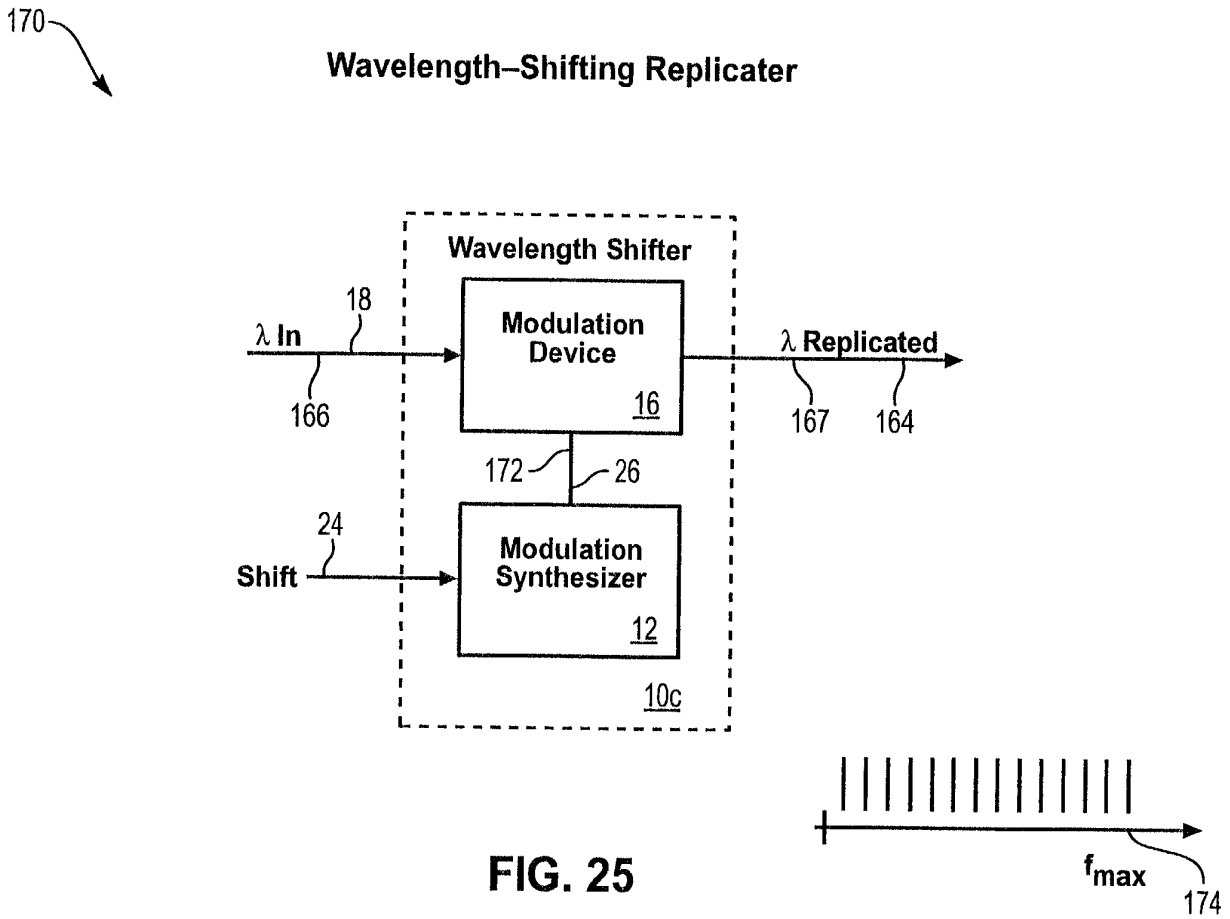


FIG. 25

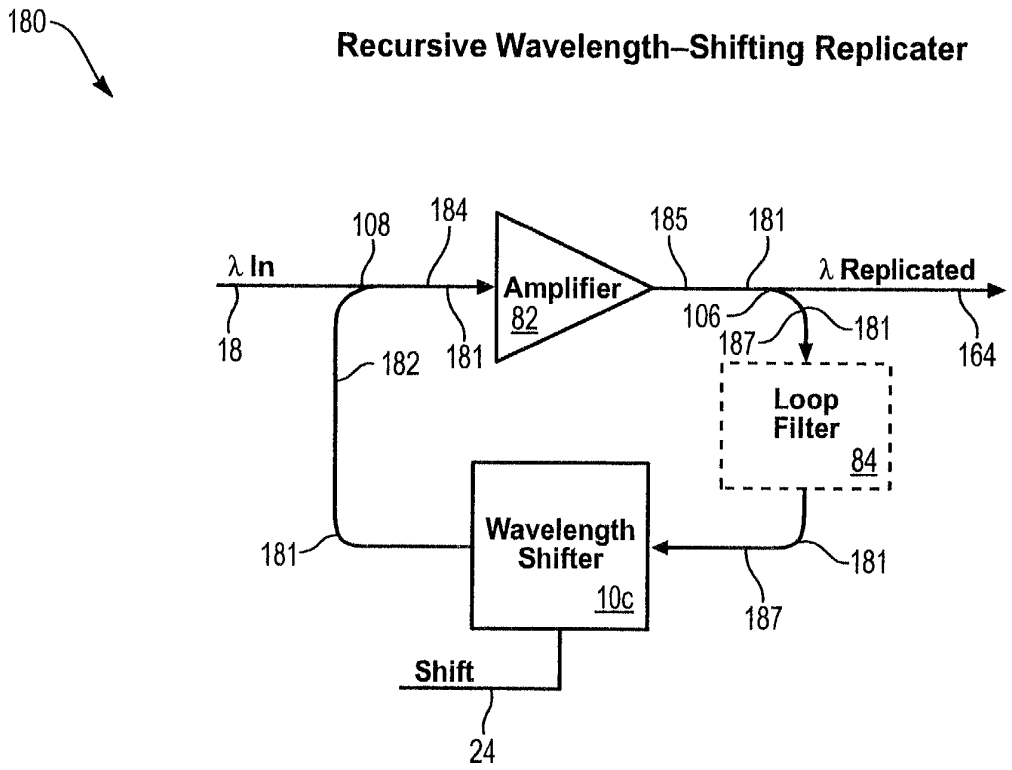

180
Recursive Wavelength–Shifting Replicater
λ In
18
108
184
Amplifier
82
181
182
185
181
λ Replicated
106
187
181
164
Loop
Filter
84
Wavelength
Shifter
10c
181
181
187
Shift
24

FIG. 26

PROOF - DO NOT PUBLISH

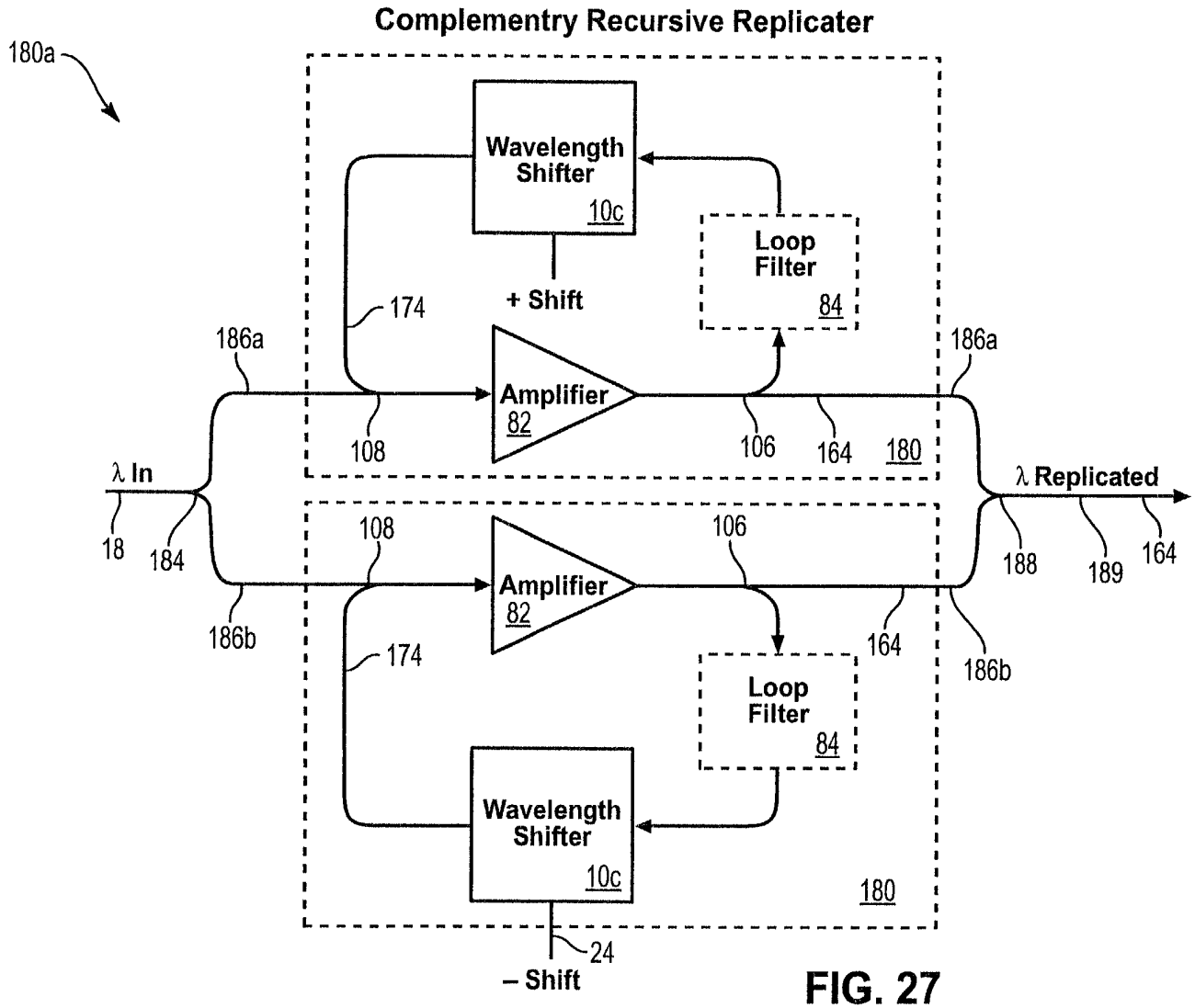


FIG. 27

Document Preview

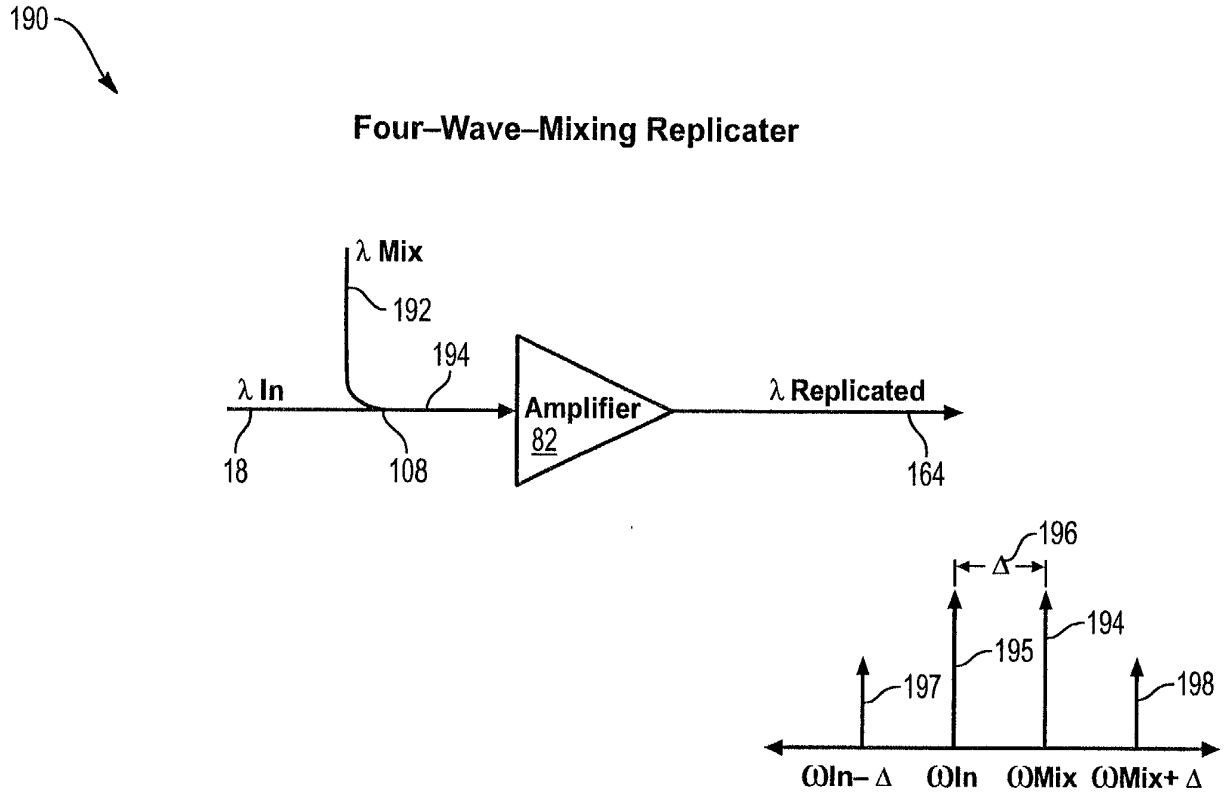


FIG. 28

Patent Application

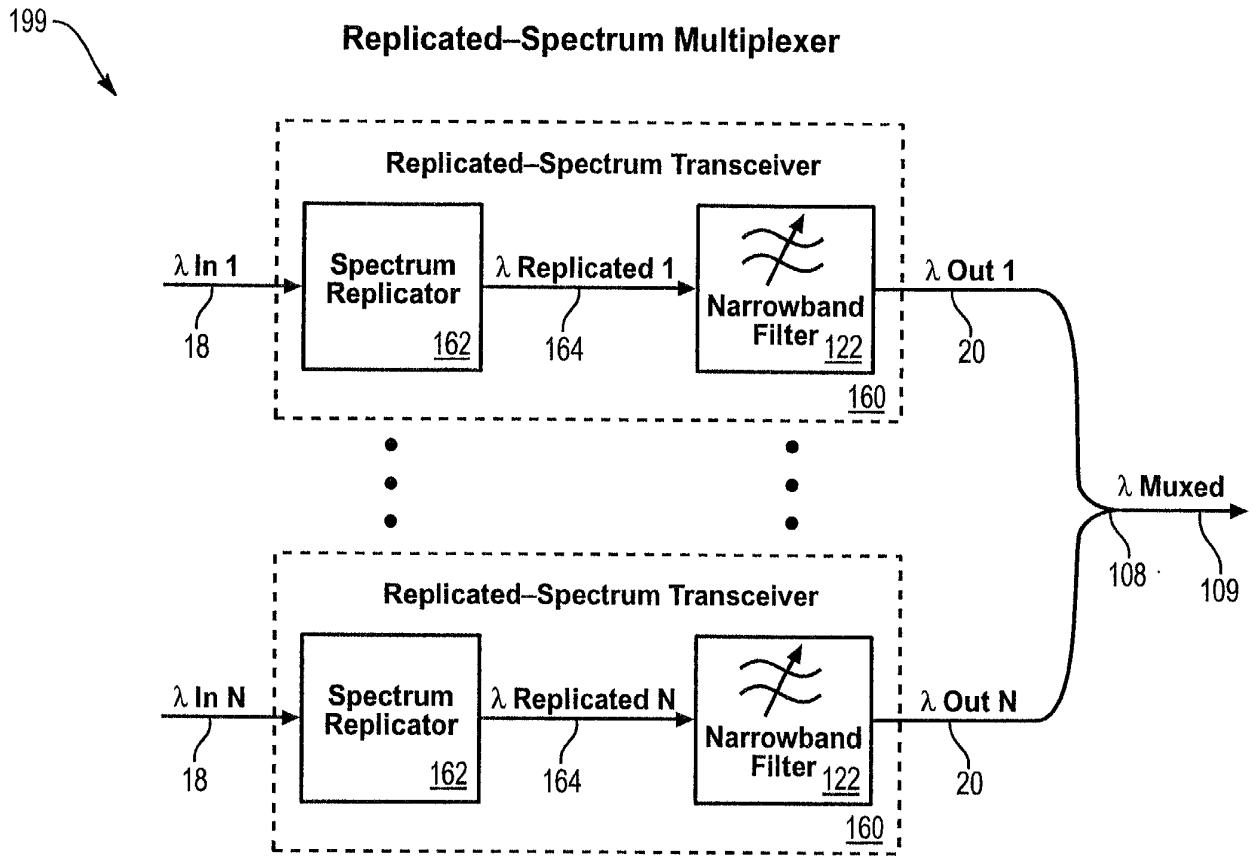


FIG. 29

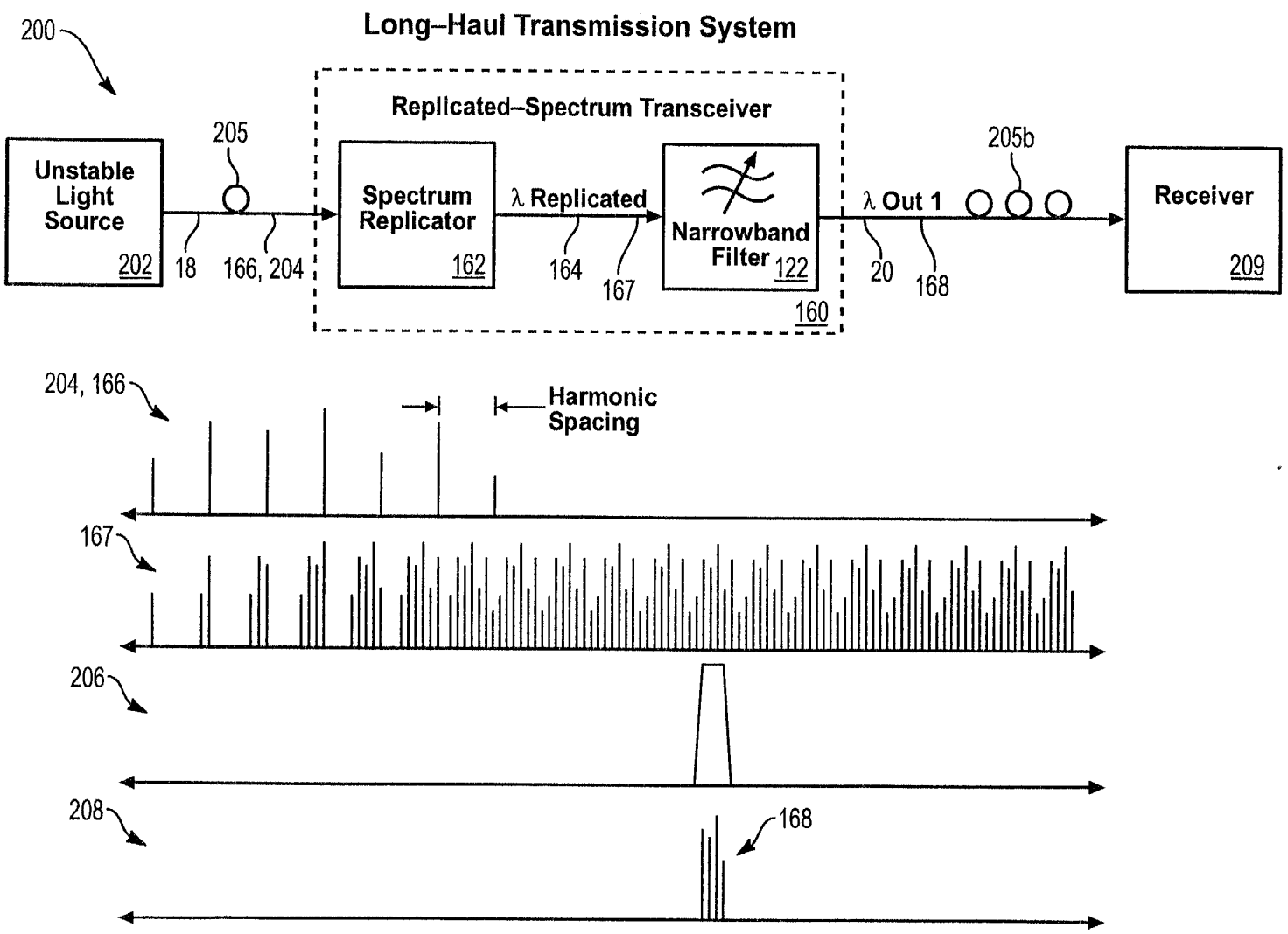

Long–Haul Transmission System
200
Replicated–Spectrum Transceiver
Unstable Light Source
202
205
18
166, 204
Spectrum Replicator
162
λ Replicated
164
167
Narrowband Filter
122
160
λ Out 1
20
168
205b
Receiver
209
204, 166
Harmonic Spacing
167
206
208
168

FIG. 30

Document Preserved

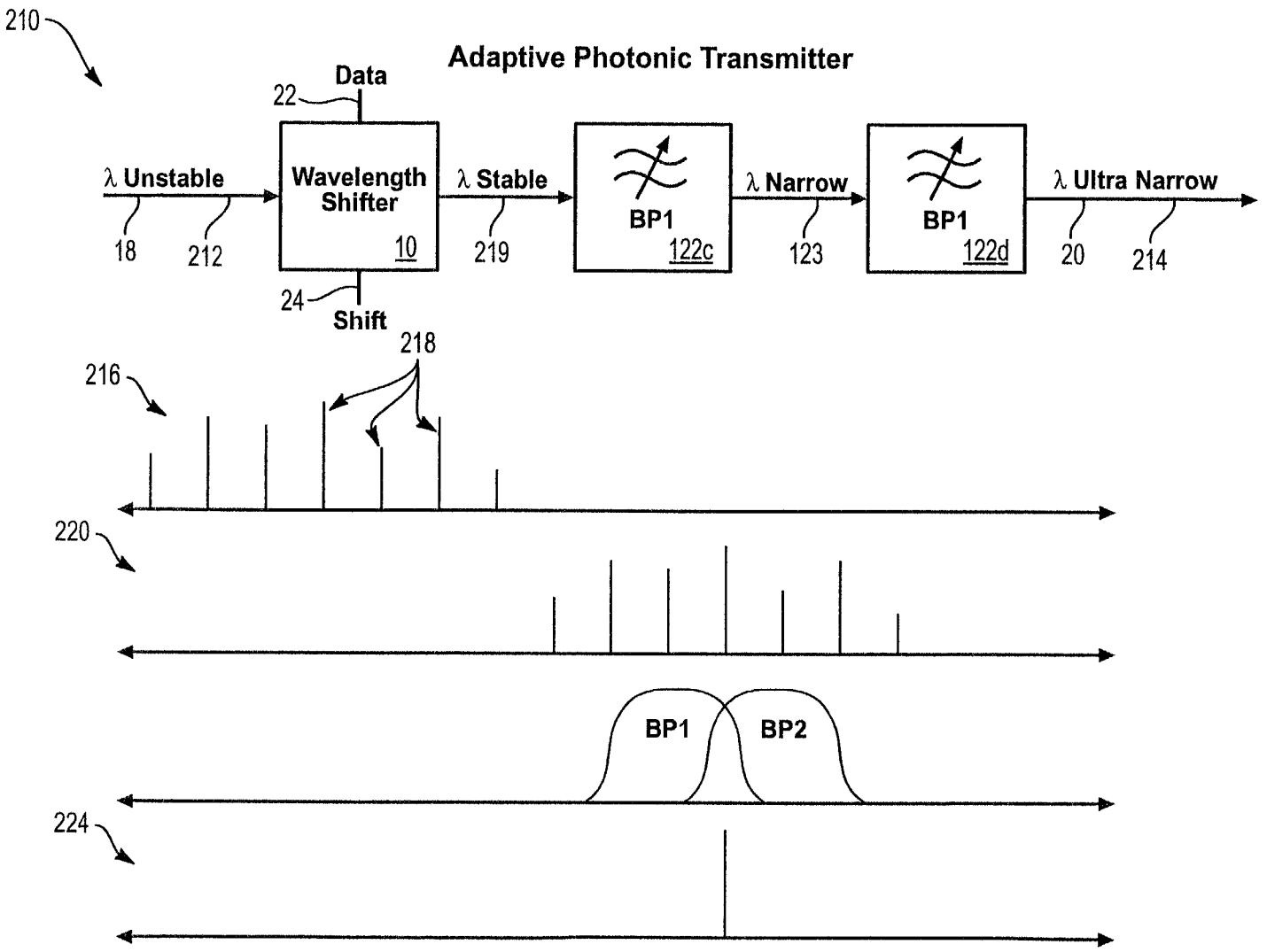


FIG. 31

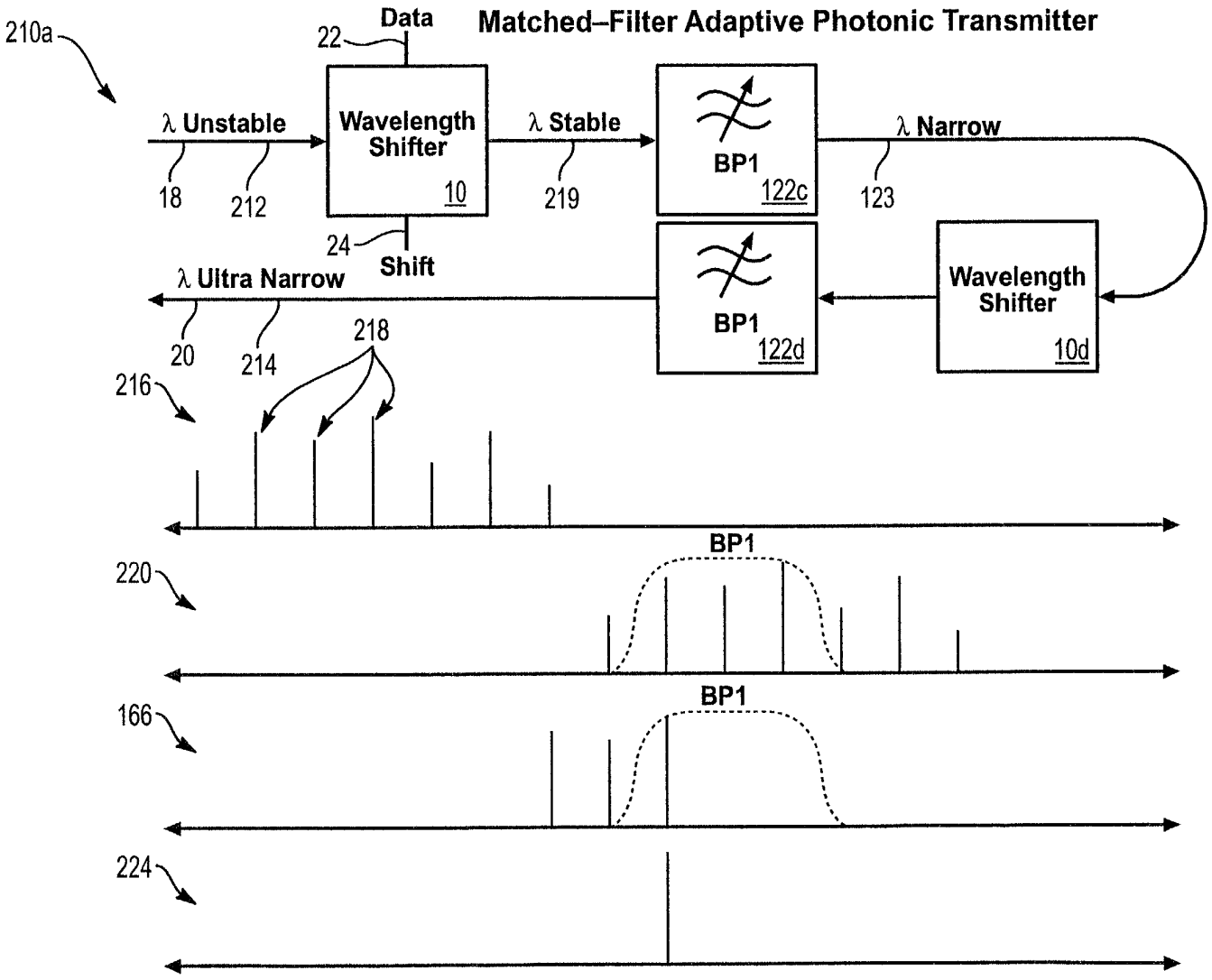

Matched–Filter Adaptive Photonic Transmitter
210a
Data
22
λ Unstable
18
212
Wavelength Shifter
10
λ Stable
219
BP1
122c
λ Narrow
123
24
Shift
λ Ultra Narrow
20
214
218
BP1
122d
Wavelength Shifter
10d
216
220
BP1
166
BP1
224

FIG. 32